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the apparent evidences of proximity of the stars, that is between brightness and magnitude of proper motion.

To the memoir is attached an appendix containing the elements of every sort used in the calculations, including the values of the functions of R.A. and N.P.D. which are necessary in the formation of the equations of condition.

Note on the Development of the Disturbing Function in the Lunar Theory. By Sir J. W. Lubbock, Bart.

Mr. Cayley, in a paper recently published, has pointed out some errors in the development of R given by me in my work on the Lunar Theory, and amongst others in the numerical coefficient of the term of which the argument is $2\tau + \xi - 3\xi'$, which I called $+\frac{45}{64}$, but which should be $-\frac{845}{64}$

$$\frac{d\mathrm{R}}{de} = \frac{r\,d\mathrm{R}}{dr}\,\frac{dr}{r\,de} + \frac{d\mathrm{R}}{d\lambda}\,\frac{d\lambda}{de}$$

λ being the true longitude.

If we consider the term of which the argument is $2\tau + \xi$, in order to have the part multiplied by e, it is sufficient to take,

$$\frac{r\,d\mathrm{R}}{dr} = 2\,\mathrm{R}_1 \cos 2\tau \qquad \frac{d\mathrm{R}}{d\lambda} = -2\,\mathrm{R}_1 \sin 2\tau$$

$$\frac{dr}{r\,de} = -\cos\xi \qquad \frac{d\lambda}{de} = 2\sin\xi \quad \text{see p. 26 Lunar Theory, Part 1.}$$

$$\begin{aligned}\frac{d\mathrm{R}}{de} &= 2\,\mathrm{R}_1 \cos 2\tau \times -\cos\xi - 2\,\mathrm{R}_1 \sin 2\tau \times 2\sin\xi \\ &= \mathrm{R}_1 \{-\cos(2\tau+\xi) - \cos(2\tau-\xi) \\ &\qquad + 2\cos(2\tau+\xi) - 2\cos(2\tau-\xi)\} \\ &= \mathrm{R}_1 \cos(2\tau+\xi) - 3\,\mathrm{R}_1 \cos(2\tau-\xi).\end{aligned}$$

When the term only involves the first power of e, as in this instance, $\int \frac{d\mathrm{R}}{de}\,de = \mathrm{R}$, or the coefficient of the term in R is the same as that of the corresponding term in $\frac{d\mathrm{R}}{de}$.

The preceding result is entirely independent of ξ', and, moreover, would have been the same whatever multiple of ξ' had accompanied 2τ, so that as

the coefficient of $\cos(2\tau+\xi)$ = the coefficient of $\cos 2\tau$

" $\cos(2\tau+\xi-\xi')$ = " $\cos(2\tau-\xi') = -\frac{21}{8}$

" $\cos(2\tau+\xi-2\xi')$ = " $\cos(2\tau-2\xi') = -\frac{51}{8}$

" $\cos(2\tau+\xi-3\xi')$ = " $\cos(2\tau-3\xi') = -\frac{845}{64}$

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so also the coefficient of $\cos(2\tau+\xi+\ \xi')$ = coefficient of $\cos(2\tau+\ \xi') = \frac{3}{8}$

,, $\cos(2\tau+\xi+n\xi')$ = ,, $\cos(2\tau+n\xi')$

whatever n may be.

Many other similar equations of condition obtain. When I published the development in question I was not aware of the extent to which this means of verification may be carried in the lunar theory, but, as owing to Mr. Cayley's recent work, no uncertainty can exist with regard to the numerical order of any coefficient in this stage of the approximation, it is unnecessary to give any further examples.

March 14, 1859.

Note on a Group of Solar Spots observed on the 23d of February, 1859. By W. R. Birt, Esq.

Mr. Birt's observations were made with Mr. Slater's refractor of 15 inches aperture, which was liberally placed at his disposal for the purpose. They were accompanied with a sketch exhibiting the details of the phenomena seen by him.

The nucleus of the principal spot presented a *striated* appearance, the direction of the *striæ* being that of the longest diameter of the spot. The illumination of the cloudy stratum was of a varied character, conformably to Mr. Dawes' observations (*Monthly Notices*, vol. xii. p. 168). It also exhibited unmistakeable traces of a striated formation, which seemed to be connected with the jagged or uneven edge of the nucleus. In this respect the observations of the author do not accord with those of Mr. Dawes.

The author thus proceeds :—

"The most interesting feature of the nucleus consisted in two luminous patches presenting nearly if not quite the same intensity of light as the surrounding penumbra. These patches during the time of observation exhibited a somewhat fluctuating character, not so much in respect of luminosity as of position. They were confined to the upper part of the nucleus, but underwent changes of configuration.

"*The Penumbra* manifested the striated or ridged appearance spoken of by Mr. Dawes in a most characteristic manner. I am strongly disposed to regard the penumbra of this particular spot as *radiated.* Mr. Dawes' sketch before alluded to exhibits very distinctly the kind of radiation which I noticed in the spot now under consideration; the edges of the penumbra were notched, jagged, and uneven, and the outline was not coincident with the outline of the nucleus. I particularly remarked that the luminosity of the penumbra was nearly uniform, and broken only by a bright spot near the horns, forming the upper

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